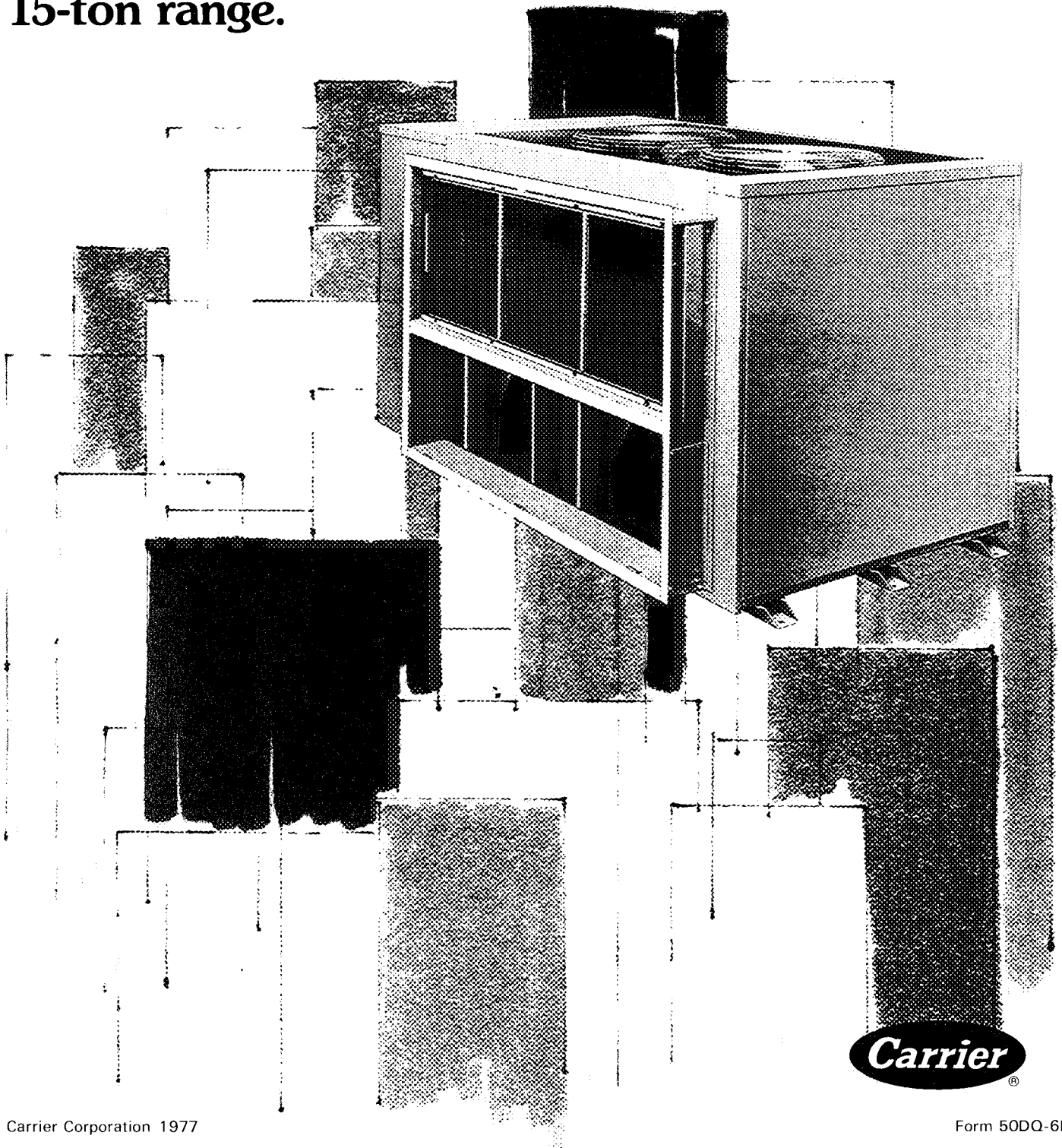


# Carrier Single-Package Heat Pumps

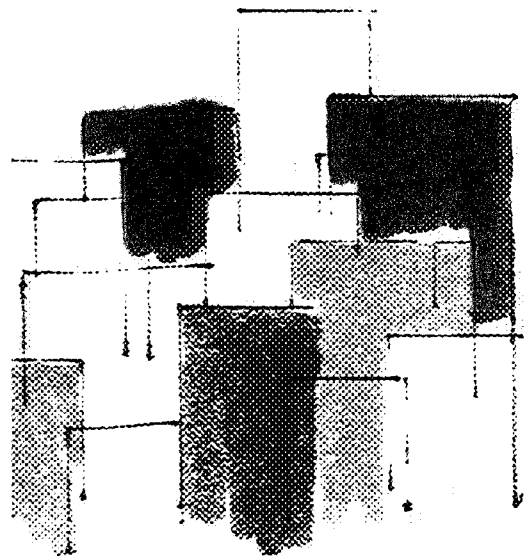
50DQ



Easy on energy, low on costs — an efficient, dependable, year-round, all-electric heating and cooling unit . . . with capacities in the 15-ton range.



# Reliability and efficiency in commercial and industrial applications



Energy and operating expense. They get first consideration these days. Especially in plans for heating and cooling systems for commercial, industrial, or educational buildings.

Heat pumps — especially Carrier heat pumps — look good on both points. They are electric — so energy supply is available. They also make very efficient use of power — particularly in heating, where it counts most. And they are reliable, so operating expense is kept to a minimum.

The Carrier Model 50DQ016 offers 15 nominal tons of cooling . . . with airflows up to 6300 cfm. It is completely self-contained in a weather-resistant steel cabinet, piped, wired, charged and tested at the factory. It can be mounted outdoors on a slab, or on the roof, using a factory-designed rooftop adapter and roof curb. Installation is simplified to save time and money.

You can count on consistent performance from a heating and cooling system planned around the Carrier Model 50DQ016 heat pump. It can be applied in almost any climate for year-round operation.

Carrier engineered this heat pump to include built-in safeguards that keep downtime and interruptions to a minimum.

◉ **A time-tested, high-efficiency compressor** — The Model 06D. Semihermetic type. Rugged cast-iron housing. It has been in use in

heat pumps for more than 20 years, and has a remarkable record for durability and efficiency. It's fully protected against overcurrent and overtemperature conditions, and has crankcase heaters to prevent dilution of oil by refrigerant when the unit is shut down.

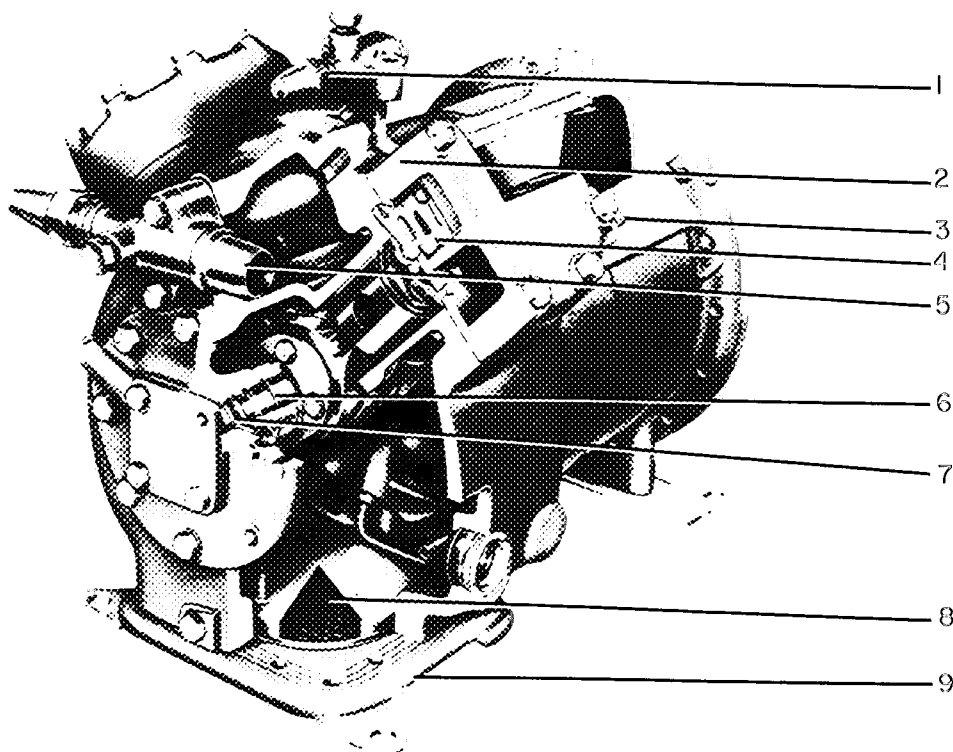
◉ **Loss of charge protection** — An internal thermostat in the discharge line prevents damage to the system. A pressurestat in the liquid line also provides freeze-up protection.

◉ **Time Guard® circuit** — Compressor cannot restart for at least five minutes after stopping for any reason. This prevents compressor short cycling.

◉ **Suction line accumulator** — Protects compressor against slugging during low temperature operation and defrost cycle.

◉ **Automatic defrost system** — Keeps coil frost-free at temperatures below 45 F. An air pressure switch senses frost build-up on coil and activates defrost system every 45 minutes if required.

◉ **Emergency heat control** — Energizes auxiliary electric heat if compressor becomes inoperative. Can be manually set to energize electric heaters and lock out the compressor. Requires use of thermostat with emergency heat switch and indicator light.



- 1 — Discharge Shutoff Valve
- 2 — Capacity Control Valve Location
- 3 — Terminal Box Location
- 4 — Discharge Valve Assembly
- 5 — Suction Shutoff Valve

- 6 — Polished Crankshaft
- 7 — Vane-Type Oil Pump
- 8 — Oil Reservoir Showing Screen and Intake Line
- 9 — Crankcase Oil Heater Location

# The Reverse Cycle principle: key to heat pump economy

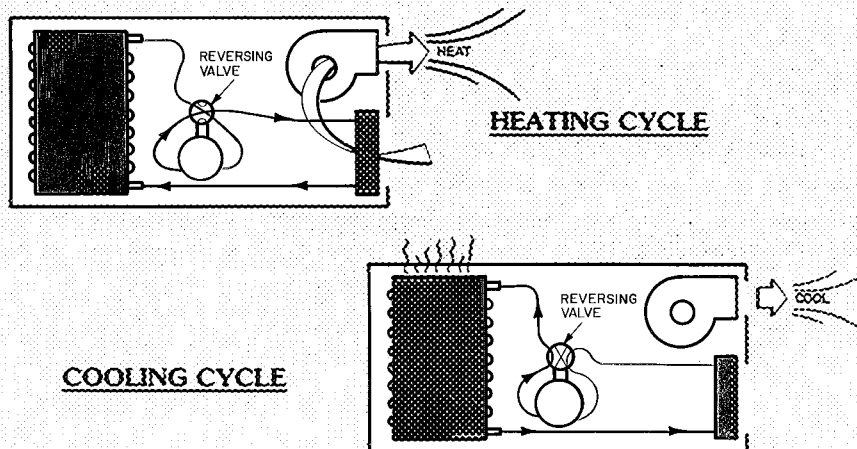
The heat pump moves or pumps heat, just as its name indicates. As a heating unit, it takes advantage of the fact that even cold, outdoor air contains heat that can be recovered for indoor use. Since it recovers heat, the heat pump produces far more energy than it uses. (Depending on outdoor air temperature, it can actually produce two to three units of heat energy for every unit of electrical energy it uses.) During summer months, the unit can be set to reverse its operating cycle, taking heat from living areas and pumping it to the outdoors.

The heat pump's cost-saving reverse cycle principle uses refrigerant circulated within a compact, closed circuit coil to absorb and transfer heat from one area to another. The process always starts with the evaporator (cooling) coil absorbing heat from the air around it, and ends with the condenser (heating) coil releasing heat to surrounding air.

As shown in the diagram, the reverse cycle principle makes double use of the two coils in the single-package heat pump. The coils alternate as evaporator or condenser, depending on whether heating or cooling is required.

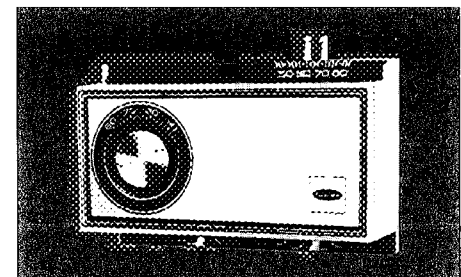
**Heating cycle.** Cold refrigerant circulating in the evaporator makes the coil colder than surrounding outdoor air, and heat is absorbed. Refrigerant is then brought to a high pressure in the compressor, becoming very hot. Hot refrigerant flows thru the condenser coil, which is now hotter than air circulating over it. Indoor air received thru the unit's return air duct is warmed by the hot coil and distributed by the indoor air fan thru the supply air duct to heat the entire building.

**Cooling cycle.** The two coils exchange roles as evaporator and condenser. Although reversed, system operation is exactly the same. Refrigerant passing thru evaporator coil makes it colder than indoor air passing over it, so heat is removed from the indoors. Refrigerant passes thru the compressor and gains more heat. Hot refrigerant makes the condenser coil hotter than outdoor air, and the coil loses heat. The heat transfer cycle is now ready to be repeated.



## Accessories

- **Rooftop adapters and curbs** — Adapters are weatherproof factory assemblies with manual outdoor air inlet dampers and screens. Adapter may be used with either concentric or separate ductwork. Curb provides support for the rooftop adapter and frames roof openings.
- **Economizer** — A modulating damper control installs easily in rooftop adapter to provide automatic outdoor air damper operation. Provides "free cooling" with outdoor air during intermediate season.
- **Electric resistance heater** — Provides supplementary heat. Used with accessory circuit breaker box.
- **Outdoor thermostat** — Provides adjustable outdoor control of accessory electric resistance heaters. Assures that heaters operate only when required, providing maximum economy.
- **Motormaster® head pressure control** — Permits cooling operation during low outdoor ambient temperatures by modulating outdoor fan motor speed.
- **Low-voltage (24-v) thermostat and subbase** — Automatic or manual changeover from cooling to heating. Continuous or cycling indoor fan operation.
- **Outside air inlet package** — Provides mixture of OA and RA for ventilation purposes.



# Physical data

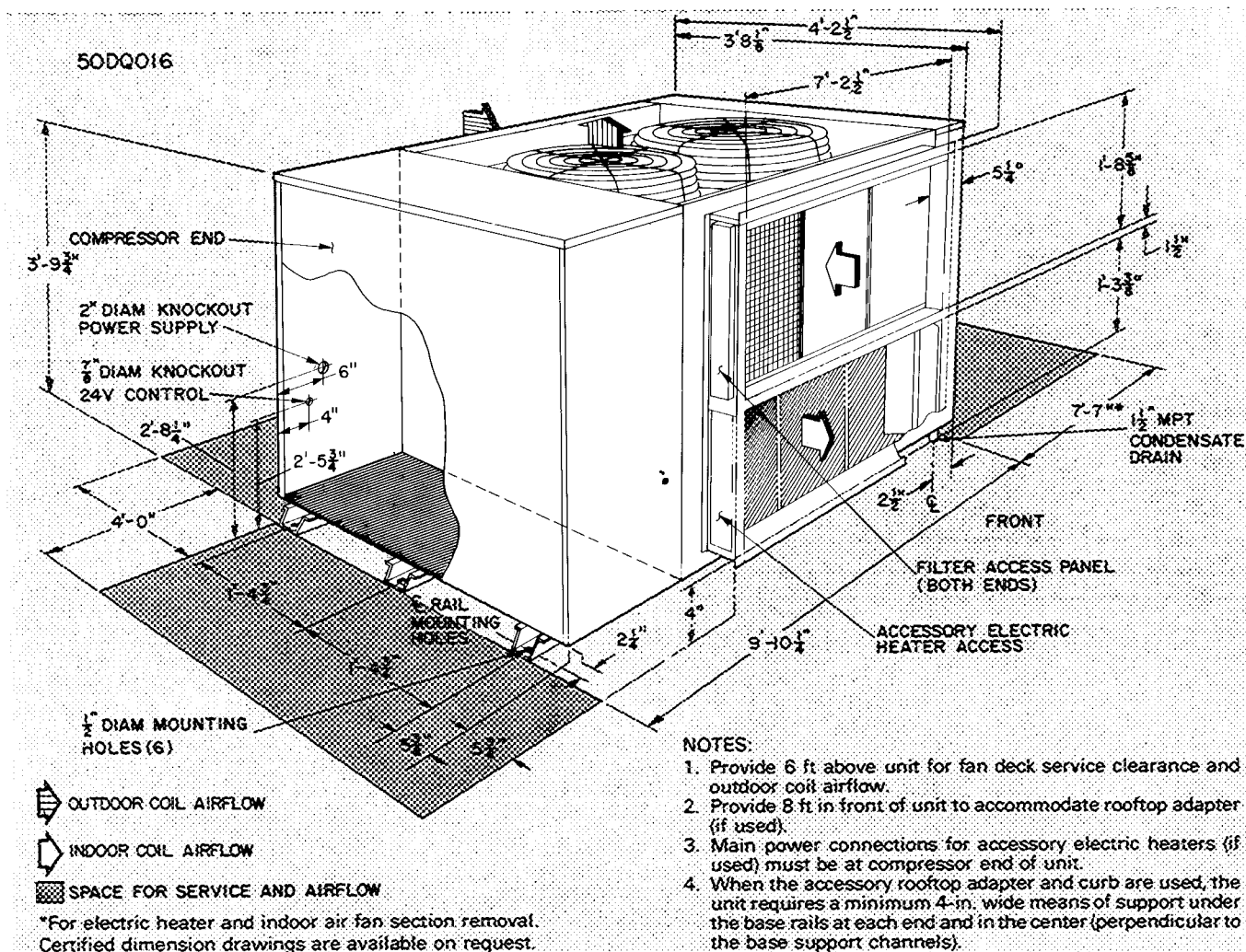
UNIT 50DQ		016
OPERATING WEIGHT (lb)		1853
REFRIGERANT		22
Operating Charge (lb)		34
COMPRESSOR, Type 06D		B537
Cylinders		6*
Rpm (60-Hz)		1750
OUTDOOR AIR FANS		Propeller, Direct Drive
No. ...Diam (in.)		2 26
Nom Cfm Total		10,000
Motor Hp . Rpm		3/4 1075
3 ph		3/4 1140
OUTDOOR COILS No. . Type		1 Plate Fin
Rows...Fins/in.		3 15
Total Face Area (sq ft)		24 0
INDOOR AIR FANS		Centrifugal, with Scroll
Type Drive		Belt
No. ...Diam (in.)		3 12
Nom Cfm		6300
Cfm Range		4500-6300
Motor Hp. .Rpm		3 1725
INDOOR COIL		Aluminum Plate Fin
Rows. .Fins/in.		3 15
Total Face Area (sq ft)		13 7
INDOOR AIR FILTERS†		2 20x20‡
No. ...Size (in.)		2 20x25‡

\*Two cylinders have an electric unloader for capacity control at partial load operation

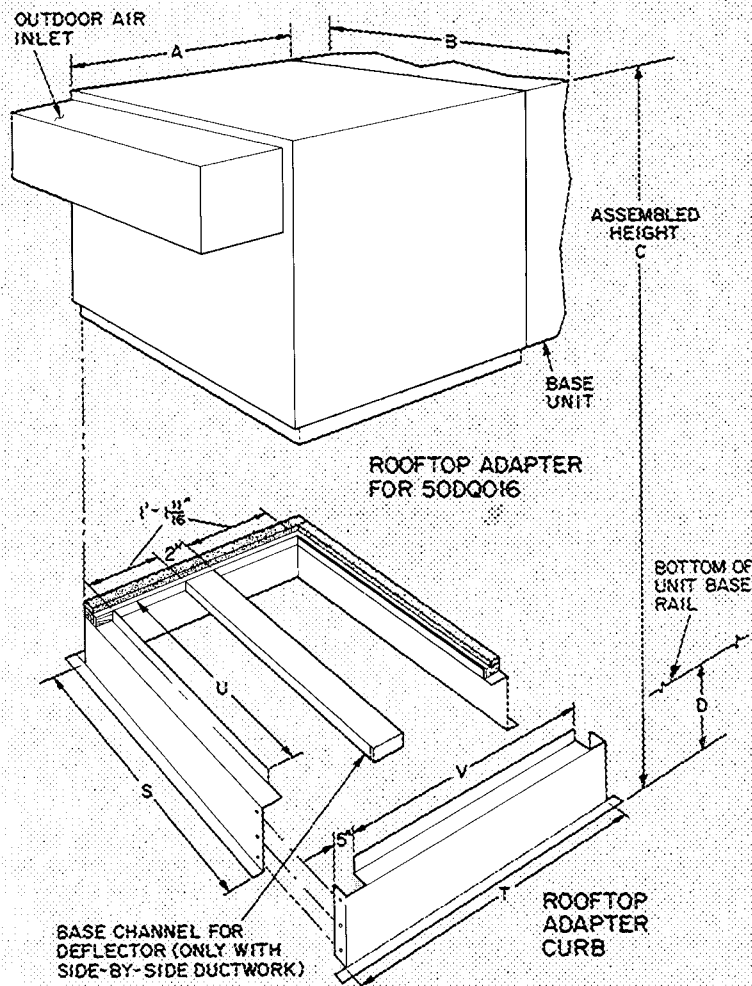
†Cleanable filters are factory supplied and installed in a filter rack on base unit

‡Unit will accept 2-in. thick filters

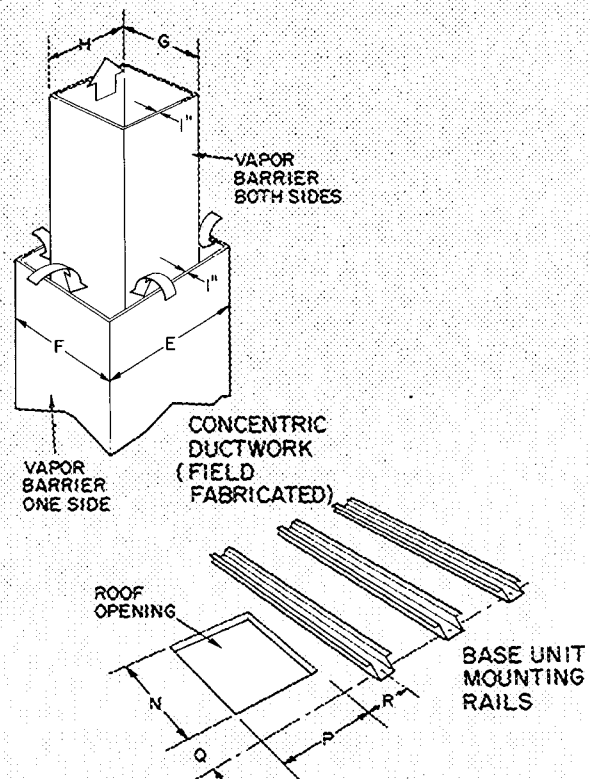
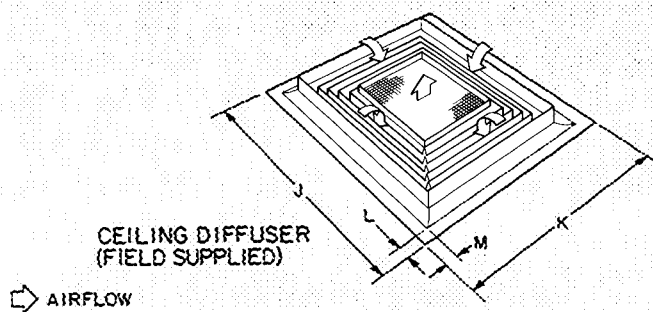
## Base unit dimensions



# Accessory dimensions (ft-in.)



ACCESSORIES FOR UNIT 50DQ		016
DIMENSIONS (ft-in.)		
Duct Adapter	A	3— 8¼
	B	8— 0¾
	C	4— 8¾
	D	1— 1¼
Duct Package	E	2— 5¾
	F	6— 9¾
	G	1— 7¾
	H	4— 11¾
Ceiling Diffuser (Field Supplied)	J	2— 10¾
	K	7— 2¾
	L	¾
	M	¾
Roof Opening	N	7— 5¾
	P	3— 2
	Q	0— 3¾
	R	1— 1½
Roof Adapter Curb	S	7— 7¾
	T	3— 3¾
	U	6— 9¾
	V	2— 5¾



# Selection procedure (with example)

## I Determine job requirements.

### Cooling

Unit Cfm .....	6,200
Cooling Load TC/Btuh .....	163,000
SHC/Btuh .....	130,000
Outside Air Temp (Cond Ent Air) .....	95 F
Air Entering Evaporator (wb) .....	67 F
(db) .....	81 F
Power Supply V/Ph/Hz .....	460/3/60
External Static Pressure (in. wg) .....	.5

### Heating

Heating Load (Btuh) .....	179,000
At Winter Design of .....	0°F
Indoor Return Air Temp .....	68 F

## II To determine unit performance:

Enter Cooling Capacities table at given air quantity (6200 cfm) and evaporator air EWB (67 F). Read across until under 95 F condenser entering air temperature. Interpolate between 6000 cfm and 6300 cfm to find:

TC	= 166.3 MBH
SHC	= 132.6 MBH
Kw	= 17

## III Correct SHC for actual temperature of air entering evaporator (81).

The bypass factor for 6200 cfm, interpolated from Cooling Capacities table, is 0.11. From SHC Corrections Factors table, the correction factor,

after interpolation, is 0.97.

$$0.97 \times 6200 \text{ cfm} = 6014 \text{ Btuh}$$

Since we are above 80 DB return air we add 6014 Btuh to our SHC.

$$132,600 + 6,014 = 138,614 \text{ Btuh}$$

This 138,600 Btuh is the actual unit SHC at our entering conditions.

## IV Determine fan speed and Bhp at required conditions.

Enter Fan Performance table at 6200 cfm and .5 in. ESP. Interpolate to 1050 rpm and 2.9 Bhp. A standard motor and drive are indicated.

## V Find number of electric resistance heaters.

Enter Instantaneous/Integrated Heating Ratings and note ratings are based on 6300 cfm at 70 F return air.

Notes 1 and 2 yield information regarding adjustments to integrated heating capacity due to slight variations in EDB and cfm. At 0°F, integrated heating capacity is 82,000 Btuh.

At 68 F EDB add approximately 1%.

At 6200 cfm subtract approximately 1%.

Therefore no resulting change. The heating load is 179,000 Btuh and  $179,000 - 82,000 = 97,000$  Btuh of electric resistance heat is necessary. Enter Electric Resistance Heater Capacities table at 460/3/60 power supply — 45.3 Kw heater is more than adequate.

# Performance data

COOLING CAPACITIES

UNIT 500Q Refrig	EVAP AIR		CONDENSER ENTERING AIR TEMPERATURE (F)														
	Cfm	Ewb	85			95			100			105			115		
			TC	SHC	Kw*	TC	SHC	Kw*	TC	SHC	Kw*	TC	SHC	Kw*	TC	SHC	Kw*
016 22	4500 08	72	183	93	16.2	172	89	17.2	168	87	18.0	162	86	18.7	152	83	19.7
		67	168	116	15.5	159	113	16.6	155	112	17.0	150	110	17.6	140	106	18.7
		62	154	141	14.7	146	137	15.6	143	135	16.2	138	133	16.8	130	129	17.5
	6000 10	72	190	103	16.6	179	100	18.0	174	98	18.5	169	96	19.2	157	93	20.2
		67	175	135	16.0	165	132	16.9	161	129	17.4	156	128	17.9	145	124	19.1
		62	161	161	15.0	152	152	16.0	149	149	16.7	143	143	17.2	134	134	17.9
	6300 11	72	191	106	16.6	180	103	18.0	175	100	18.6	170	98	19.3	158	94	20.3
		67	177	138	16.1	167	133	17.0	163	132	17.5	157	130	18.0	146	126	19.3
		62	162	162	15.1	154	154	16.1	150	150	16.8	144	144	17.3	135	135	18.1

BF	— Bypass Factor
Kw	— Compressor Motor Power Input Based on rated voltage of equipment
TC	— Total Capacity (1000 Btuh)
SHC	— Sensible Heat Capacity (1000 Btuh)

\*For total power input, add to compressor motor input the indoor fan motor input and outdoor fan motor input of 2.6 Kw

## NOTES

- 1 Direct interpolation is permissible. Do not extrapolate.
- 2 Ratings shown are gross capacities. Indoor fan motor heat has not been deducted.
- 3 SHC is based on 80 F db temperature of air entering evaporator coil.  
Below 80 F db, subtract (corr factor x cfm) from SHC.  
Above 80 F db, add (corr factor x cfm) to SHC.

## SHC CORRECTION FACTORS

ENT AIR DRY-BULB TEMP (F)						
BYPASS	79	78	77	76	75	under 75
FACTOR	81	82	83	84	85	over 85
Correction Factor						
05	1.04	2.07	3.11	4.14	5.18	use formula shown below
10	.98	1.96	2.94	3.92	4.91	
20	.87	1.74	2.62	3.49	4.36	

## FAN PERFORMANCE

UNIT 500Q	Cfm	EXTERNAL STATIC PRESSURE (in wg)									
		0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.1
		Rpm									
		Bhp									
016	4500	—	—	—	850	890	935	1025	1080	1130	1170
		—	—	—	1.00	1.30	1.60	2.20	2.45	2.70	3.00
	5000	—	—	—	890	930	975	1070	1120	1175	—
		—	—	—	1.50	1.75	2.05	2.60	2.90	3.20	—
	5500	—	860	900	940	980	1025	1120	1170	—	—
		—	1.40	1.70	2.00	2.25	2.50	3.10	3.40	—	—
016	6000	860	900	940	980	1025	1075	—	—	—	—
		1.55	1.80	2.10	2.40	2.70	3.00	—	—	—	—
016	6300	890	930	970	1020	1060	1110	—	—	—	—
		1.90	2.20	2.45	2.75	3.00	3.35	—	—	—	—

*Italics Rpm* — Field-supplied drive required

*Italics Bhp* — Field-supplied motor required

NOTE Values include deduction for wet-coil and clean filters

## ELECTRIC RESISTANCE HEATER CAPACITIES

UNIT 500Q	NOM VOLTS	KW	NO HEATERS			
			0*	1†	2†	3†
			Total Capacity (1000 Btuh)			
			Minimum Cfm			
016	208	37.2	—	126.4	—	—
			4500	4500	—	—
	230	45.5	—	154.5	—	—
016			4500	4500	—	—
	460	45.5	—	154.5	—	—
016			4500	4500	—	—
			4500	4500	—	—

\*at 65 F wb outdoor air

†Established by UL at 45 F db, 43 F wb outdoor air

### NOTES

- Capacities shown are based on voltages shown. For a 10% reduction in voltage, reduce input and capacity 19%. For a 10% increase in voltage, increase input and capacity 21%.
- Operation below cfm listed will cause tripout on unit high-pressure cutout switch and/or heater high-temperature protection device.

## INDOOR FAN DATA

UNIT 500Q	MOTOR					DRIVE				
	Type	Nom Hp	Max Bhp	Frame	Shaft Diam	Type	Motor PDR	Fan PPD	Change*	FSR
016	Std	3	3.50	56	7/8	Std	4.0-5.0	8.2	30.0	860-1060

FS — Field Supplied

FSR — Fan Speed Range (rpm)

PDR — Pitch Diameter Range of Adjustable Pulley

PPD — Pulley Pitch Diameter

Std — Standard

\*Fan rpm change per 1/2 turn of adjustable motor pulley

NOTE

Maximum allowable fan speed is 1200 rpm

## INSTANTANEOUS/INTEGRATED HEATING RATINGS (60-Hz)

UNIT 500Q	INDOOR AIR (Cfm)	TEMPERATURE AIR ENTERING OUTDOOR COIL (F db at 85% rh)																	
		-10		0		10		20		30		40		45		50		60	
		Cap.	Kw	Cap.	Kw	Cap.	Kw	Cap.	Kw	Cap.	Kw	Cap.	Kw	Cap.	Kw	Cap.	Kw	Cap.	Kw
016	6300	—	—	84	10.6	104	11.4	123	12.7	144	13.9	171	15.9	185	16.8	198	17.7	227	19.9
		—	—	82	10.6	101	11.4	119	12.7	139	13.9	156	15.9	185	16.8	198	17.7	227	19.9

☐ Instantaneous Rating

☐ Integrated Rating

Cap. — Heating Capacity (1000 Btuh), includes indoor fan motor heat

Kw — Power Input; includes compressor motor power input and outdoor fan motor input

### NOTES

- Heating ratings are based on an entering dry-bulb temperature to the indoor coil of 70 F. For a 5 F increase in the temperature of the air entering the indoor coil, decrease the capacity by 2%. For a 5 F decrease in the temperature of the air entering the indoor coil, increase the capacity by 2%.
- For a 10% decrease in indoor air quantity, decrease capacity by 5%.
- Integrated capacity is the instantaneous capacity less the effect of frost on the outdoor coil and the heat required to defrost it.
- For prolonged operation at temperatures below those shown above, contact your Carrier dealer for information.

# Electrical data

UNIT 50DQ	V-PH-HZ	VOLTAGE RANGE		COMPR		OUTDOOR FAN MOTOR		INDOOR FAN MOTOR		POWER SUPPLY	
		Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	Min Ckt Amps	Max Fuse Amps
016	200-3-60	180	229	63.6	266	2	4.5*	3	8.8	100.0	125
	230-3-60	198	254	57.2	240	2	4.5*	3	8.2	90.1	110
	460-3-60	414	506	28.6	120	2†	1.9*	3	4.1	44.4	50

\*Values are identical for each outdoor fan motor

†Outdoor fan motors are 3-phase

Compr  
FLA  
Hp

— Compressor  
— Full Load Amps  
— Horsepower

LRA — Locked Rotor Amps  
RLA — Rated Load Amps

## ELECTRIC RESISTANCE HEATERS\*

UNIT 50DQ	V/PH	HEATER		HEATERS ALLOWED PER BASE UNIT	POWER SOURCES REQD/ HEATER
		Kw	Full Load Amps		
016	208/3	12.3	36.9	34.0	102.0
	230/3	15.1	45.3	38.0	114.0
	240/3	16.5	49.5	40.0	120.0
	460/3	15.1	45.3	19.0	57.0
	480/3	16.5	49.5	20.0	60.0

Heater has 3 separate heating elements. Shaded values are for each individual element

\*Heaters must be installed with Carrier accessory circuit breaker assemblies

## RESISTANCE OF ACCESSORIES (in. wg)

UNIT 50DQ	CFM	100% RETURN AIR		100% OUTDOOR AIR
		Without OA Damper	With OA Damper	With OA Damper
016*	4500	19	28	36
	6000	35	50	64
	6300	39	55	72

\*Includes rooftop adapter, duct package, ceiling diffuser (field supplied) and outdoor air inlet damper, except as noted

## Base unit operating sequence

**Cooling** — With the thermostat set at SYSTEM AUTO., FAN AUTO. and desired temperature:

When the thermostat calls for cooling, the indoor fan motor, outdoor fan motor(s) and the control relay are energized. The Time Guard® timer is also energized and starts the compressor about 15 seconds after the fans start.

For second-stage cooling, a second control relay energizes the capacity control solenoid valve and de-energizes the compressor unloader solenoid valve.

When the unit is shut off (at the thermostat), the compressor and fans are de-energized. The timer motor operates for 4 minutes and 45 seconds to prevent a compressor restart and then shuts off.

**Heating** — When the thermostat calls for heating, the indoor fan motor, outdoor air fan motors, and the reversing valve(s) are energized. The compressor starts about 15 seconds after the fans start (The compressor operates fully loaded.)

For second-stage heat (electric resistance heat), the second stage of the thermostat energizes the heating control relay(s) and electric heater element(s).

When the unit is shut off (at the thermostat) the compressor, fans, heating control relays and the heater(s) are de-energized. The timer operates for 4 minutes and 45 seconds to prevent a compressor restart and then shuts off.

**Air circulation** — When the fan switch is at FAN ON, indoor air fans operate continuously to provide ventilation. Thermostats operate other components as described above.

**Defrost cycle** — On unit 50DQ016, a defrost pressure switch closes on a pressure drop across the frosted outdoor coil. The defrost timer motor contacts close for 10 seconds and if the defrost thermostat is closed (outdoor coil liquid line at or below 45 F), the reversing valves and outdoor air fans are de-energized. The unit operates on this modified cooling mode to defrost coil. This defrost cycle continues until the defrost thermostat opens or 10 minutes have elapsed.

The defrost timer operates for 45 minutes after the beginning of the defrost cycle and then stops. Timer will not restart until the defrost pressure switch closes again to initiate defrost.

**Emergency heat cycle** — If the compressor is inoperative due to a tripped safety device, the second stage of the thermostat automatically energizes the electric resistance heaters, fan runs continuously.

If desired, the compressor can be manually locked out by setting the thermostat at EMERGENCY HEAT. In both instances, the EMERGENCY HEAT indicator light on the thermostat assembly is illuminated.

## Economizer operating sequence

**Cooling season** — When thermostat assembly is set at SYSTEM COOL and FAN AUTO., damper goes to vent at first stage of cooling. Outdoor and indoor air fan motors and compressor(s) operate as described in cooling operating sequence.

When stage 1 is satisfied, outdoor and indoor air fan motors and compressor shut off, and outdoor air damper closes. Damper always stays at vent during cooling sequence if fan switch is set at FAN-ON and night switch is closed (day position).

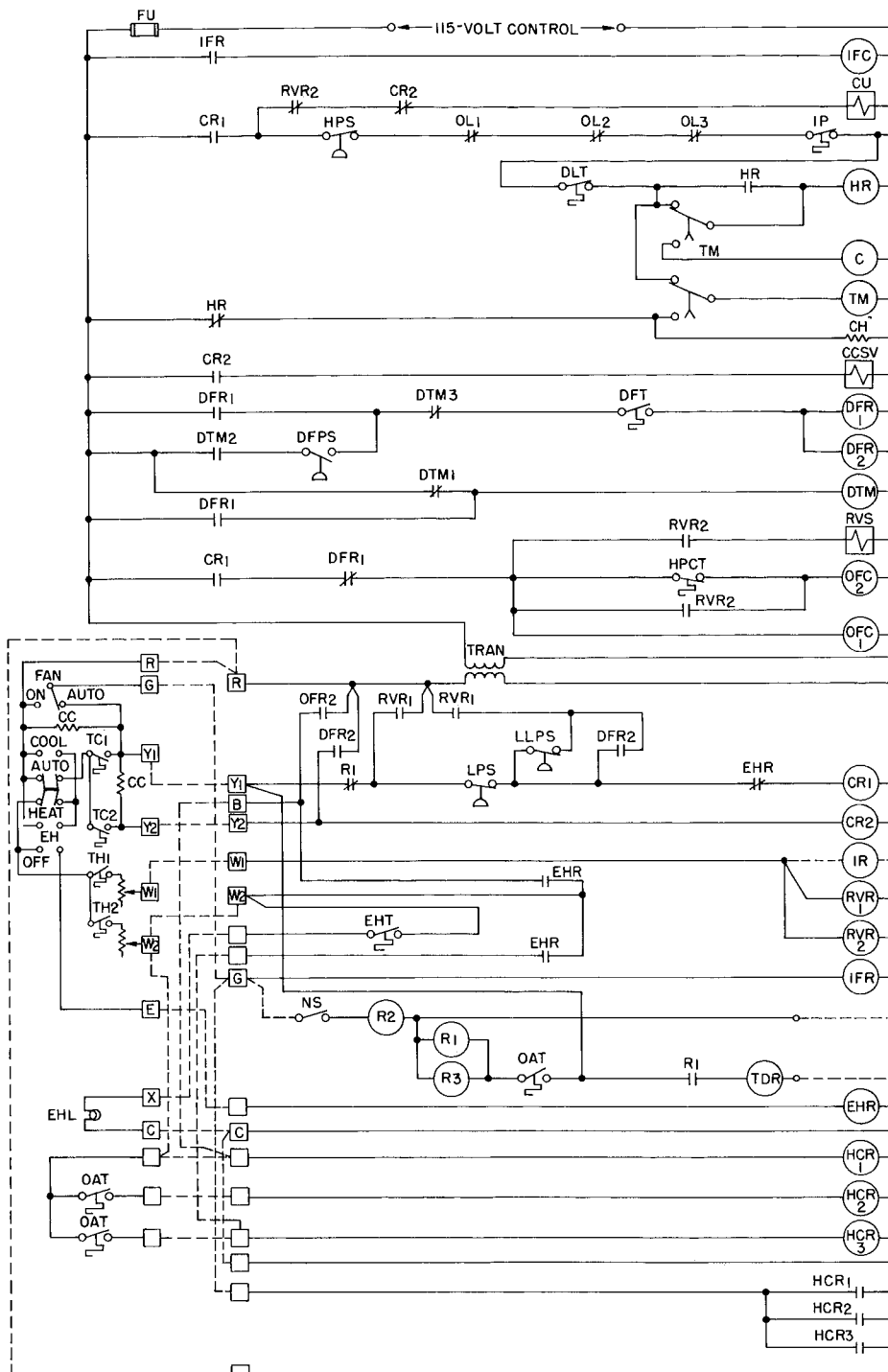
**Intermediate season** — Operation is same as for cooling season, except that as stage 1 of thermostat closes and indoor fan motor starts, compressor(s) and outdoor air fan motor(s) remain off if outdoor air temperature is below outdoor air thermostat setting. If outdoor and return air temperature rises above or drops below mixed air thermostat setting, the outside air damper repositions to maintain the mixed air thermostat setting. Damper moves to closed position when cooling stage 1 is satisfied. Damper moves to vent position when fan switch is at FAN-ON.

Outdoor air damper closes when night switch (field supplied) is opened (night position), or whenever indoor air fan shuts off.

**Heating season** — Damper is always at vent position while indoor air fan motor is operating. Outdoor air damper closes when indoor air fan shuts off and night switch is open (night position).

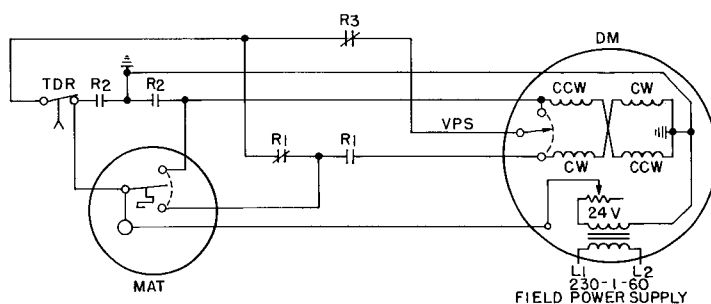


# TYPICAL CONTROL SCHEMATIC



## LEGEND

- C** — Compressor Contactor
- CC** — Cooling Compensator
- CCSV** — Cap Control Solenoid Valve
- Ccw** — Counterclockwise
- CH** — Crankcase Heater
- CR** — Control Relay
- CU** — Compressor Unloader
- Cw** — Clockwise
- DFPS** — Defrost Pressure Switch
- DFR** — Defrost Relay
- DFT** — Defrost Thermostat
- DLT** — Discharge Line Thermostat
- DM** — Damper Motor
- DTM** — Defrost Timer Motor
- EH** — Emergency Heat
- EHL** — Emergency Heat Light
- EHR** — Emergency Heat Relay
- EHT** — Emergency Heat Thermostat
- Fu** — Fuse
- HCR** — Heater Control Relay
- HPCT** — Head Press Control T'stat
- HPS** — High-Pressure Switch
- HR** — Holding Relay
- IFC** — Indoor Fan Contactor
- IFR** — Indoor Fan Relay
- IP** — Internal Protector
- IR** — Isolation Relay
- LLPS** — Liquid Line Press Switch
- LPS** — Low-Pressure Switch
- MAT** — Mixed Air Thermostat
- NS** — Night Switch
- OAT** — Outdoor Air Thermostat
- OFC** — Outdoor Fan Contactor
- OFR** — Outdoor Fan Relay
- OL** — Overload
- R** — Relay
- RVR** — Reversing Valve Relay
- RVS** — Reversing Valve Solenoid
- TC** — Thermostat Cooling
- TDR** — Time-Delay Relay
- TH** — Thermostat Heating
- TM** — Timer Motor
- Tran** — Transformer
- VPS** — Vent Position Switch
- Field Wiring
- Factory Wiring
- Splice
- Terminal Board Connections



# Application data

## Power supply and wiring

Units are completely factory wired and require only one field power supply connection. A separate power supply is required when accessory resistance heaters are used. When the modulating outdoor air control accessory is used, a separate 230-1-60 line is required for the damper motor. Field-supplied fused disconnect switches are required for base unit. Accessory heaters must be equipped with Carrier accessory circuit breaker assemblies. Refer to heater installation instructions.

## LOW OUTDOOR TEMPERATURE COOLING OPERATION

UNIT		50DQ016
MIN TEMP (F)	Std	35*
	MM	-20†

MM — Accessory Motormaster®

Std — Standard Unit

\*Head pressure control (fan cycling switch) on one fan is standard

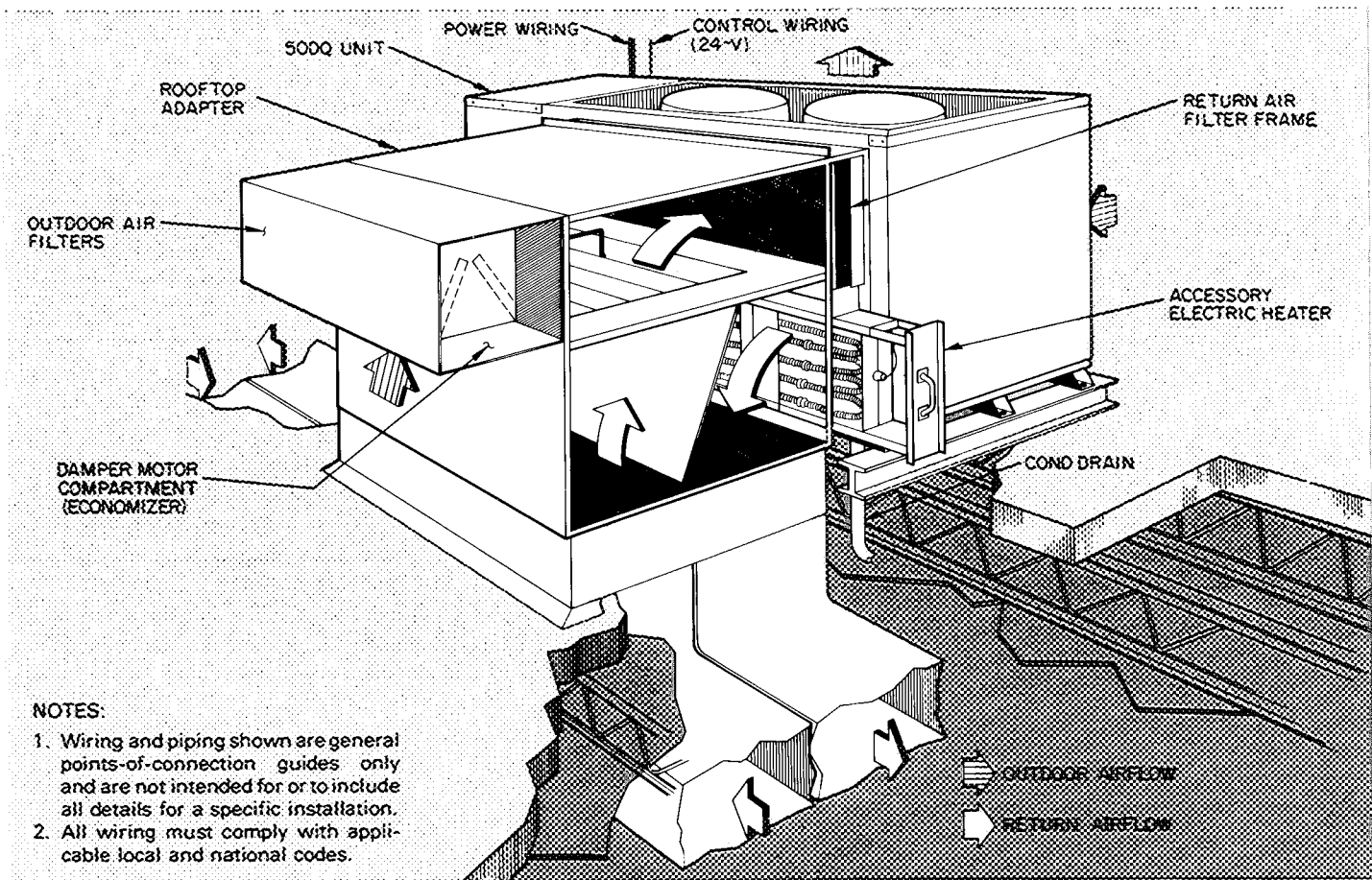
†Motormaster accessory is used to control speed of remaining fan

### NOTE

Units will operate down to temperature indicated with 32 Series Motormaster head pressure control with minor modifications to unit (refer to 32LT Motormaster Installation Instructions) Wind baffles, field-fabricated in accordance with Motormaster instructions, are also required

# Typical piping and wiring

## ROOFTOP INSTALLATION WITH SEPARATE SUPPLY AND RETURN DUCTWORK



# Guide specifications

**Furnish and install** a one-piece air-to-air electric heat pump to function as a year-round air conditioning system. Unit shall be properly assembled and tested, complete with refrigerant charge and ready to operate. Total base unit shall be UL certified.

**Total cooling capacity** shall be \_\_\_\_\_ Btuh or greater with indoor air quantity of \_\_\_\_\_ cfm and \_\_\_\_\_ F wb entering indoor coil temperature coincident with \_\_\_\_\_ F db temperature of air entering the outdoor coil. Total sensible heat capacity shall be \_\_\_\_\_ Btuh or greater with \_\_\_\_\_ F room db temperature. Compressor motor power input shall be \_\_\_\_\_ kw or less at these conditions.

**Total heating capacity** without electric heaters shall be \_\_\_\_\_ Btuh or greater at \_\_\_\_\_ F, 85% rh outdoor conditions, and \_\_\_\_\_ F indoor db temperature with \_\_\_\_\_ cfm thru indoor coil. Compressor power input shall be \_\_\_\_\_ kw or less at these conditions. One electric resistance heater (\_\_\_\_\_ kw each) shall be furnished.

**Compressor** — Unit shall contain a semihermetic multi-cylinder compressor which shall have positive constant pressure lubrication. A crankcase heater shall be supplied. Compressor shall be of the same manufacturer as the unit.

**Coils** — Unit shall contain one indoor coil and one (2) outdoor coil(s). They shall be of nonferrous construction with aluminum plate fins mechanically bonded to seamless copper tubing with all joints brazed.

**Fans** — Indoor fan shall be capable of delivering \_\_\_\_\_ cfm of air with an external static pressure of \_\_\_\_\_ in. wg or greater. The fan shall be the centrifugal type, belt driven by a permanently lubricated motor of \_\_\_\_\_ hp or less. Outdoor fan(s) shall be a propeller type, direct driven by a permanently lubricated motor(s) of \_\_\_\_\_ hp or less.

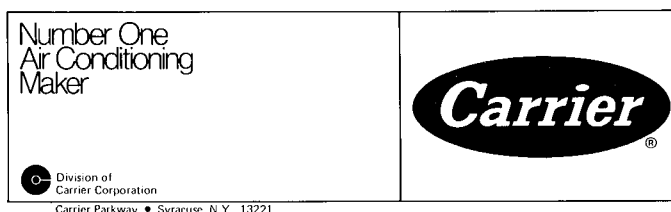
**Controls** — The cooling/heating system shall be protected by high and low pressurestats, loss of charge and indoor coil freeze-up protection devices, current- and temperature-sensitive compressor motor protectors, a device which prevents starting of the compressor more than once every 5 minutes, and a defrost circuit which consists of an air pressure switch which senses for frost accumulation every 45 minutes, and, if frost is present, automatically puts the unit into the defrost cycle.

**Maximum dimensions** — Width \_\_\_\_\_ in., depth \_\_\_\_\_ in., height \_\_\_\_\_ inches.

**Accessory rooftop adapter** shall be provided where shown on the plans. The adapter shall be of the same manufacture as the unit

**Accessories** provided for the base unit shall include: indoor thermostat, outdoor thermostat, and emergency heat relay.

The accessory electric resistance heater shall be UL certified with the unit, controlled by an outdoor air thermostat, and attached directly to the unit. Accessory circuit breaker box shall be used with electric heaters.



Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

**Tab 12**

Form 50DQ-6P Supersedes 50DQ-5P

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Book	1	4
Tab	5a	5a